

192 – GENERAL WOODWORK (CMW 11, 12 & 13)

Examination Scheme

This is a trade related course

The examination will comprise two papers.

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| 192-1 | Paper I: | This paper comprises two sections: (A and B) |
| | Section A. | consists of 40 multiple choice questions to be attempted in 40 minutes. It carries 40 marks. |
| | Section B. | consists of 5 questions out of which 4 questions will be answered in 2 hours and it carries 60 marks. |
| 192-2 | Paper 2: | Practical work for 4 hours. It carries 100 marks. This paper is to be released to the candidates TWO WEEKS before the examination date. |

Topic / Objective	Contents	Activities / Remarks
<p>1.0 General Safety</p> <p>1. List, name and identify sources of hazards, accidents and safety wears and equipment in a wood workshop.</p> <p>2. Apply the safety rules and safety measures in case of accident in a wood workshop.</p>	<p>1. Safety precautions when handling and using hand tools, power tools and machines.</p> <p>2. Sources of accidents in the workshop.</p> <p>3. Safety wears and equipment e.g. goggles, fire extinguishers etc. Materials handling, clothing, health, hazards, movement, machines operations, fire etc.</p> <p>4. First aid.</p>	<p>1. Make simple safety devices to protect the students from injury when using cutting tools, machines etc. Keep the first Aid box in the workshop. Keep a record of accidents. Show film on safety In industry. Make chart on safety procedures.</p>
<p>2.0 Wood Work Hand Tools</p> <p>1. Identify, classify and state types of hand tools and safety precautions to be observed in using the tools.</p> <p>2. State the uses and maintenance of the tools.</p> <p>3. Prepare timber to a given specification using hand tools.</p>	<p>Hand tools classification and uses</p> <p>1. Geometrical and marking – out tools:- Try square, dividers, gauges.</p> <p>2. Cutting tools:- jack, smooth, try planes. Spoke – shave etc. Chisels: Firmer, pair mortice etc. Boring: ratchet and wheel braces bits; drills and countersinks.</p> <p>3 Impelling tools; hammer, mallet etc. Maintenance of all tools. Sharpening plane cutters, chisels, drills, saw teeth set, cleaning and lubricating and storing</p> <p>4 Holding and supporting tools: G-crimp, F-crimp, bench vice etc.</p>	<p>1. Use tools in performing practical exercises.</p> <p>2. The use of oil stone to sharpen tools.</p> <p>3. Emphasize on the students' safety.</p>
<p>3.0 Timber Preparation</p> <p>1. Explain and demonstrate the principles and the sequence of cutting and plane all surfaces and edges to flatness and squareness with its mark.</p>	<p>1. Sequence of preparing timber to size.</p> <p>2. Wood work bench tools: Jack plane, hand saws, marking guage, try square, rules, smoothing plane etc.</p>	<p>1. Practical operations involved should be followed in sequence.</p>

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4.0 Marking Out 1. Interpret simple working drawings of wood work projects. 2. Identify convention of representation using on working drawings.	1. Sketching and developing of working drawing 2. Conventional representation used in woodwork.	1. Produce a working drawing for a project.
5.0 Portable Electric Tools 1. List and describe common portable hand tools. 1. Explain their operations and uses.	1. Common portable hand tools e.g.: (a) Portable saw (b) Portable planer (c) Portable drill (d) Portable sander (e) Jigsaw 2. Operations: Planing, sawing, miltreing, Drilling, sand-papering, rebating etc.	1. Practical demonstration
6.0 Wood Working Machines 1. List, state and explain Wood working machines, its purpose, working principles of each machine and observe safety precautions.	1. Basic wood-working machines: - various parts - working principles. 2. Surface planing, thicknessing, circular saw, mortising, cross cutting; drilling, simple-ended tenoning machine etc.	1. Practical demonstration 1. Operate woodworking/ machines to perform various operations.
2. Carry out various operations and maintenance of the machines.	1. Uses: of drum dust, fume and dust extractors. 2. Maintenance of machines and tools, e.g. clean lubricate all machines tools, set oil levels, replace burnt fuse, bulb and worn out drive belts etc.	
7.0 Common Wood Work Joints 1. Identify common wood work joints and their uses. 2. Construct common	Types of woodwork joints. 1. Widening joints 2. Angle joints 3. Frame joints	1. Sketch the guards, fences and other protective parts. 2. Make projects to embody joints in each group 3. Emphasise the

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wood work joints		practical application of the joints. 4. Students should not be allowed to use machines without their instructor, supervisor in the workshop.
8.0 Construct Common Woodwork joints and Frame Construction 1. Identify the various types of frame construction and state where applicable. 2. Identify the various types of carcass construction and state where each is applicable.	1. Types of frame constructions. 2. Types of carcass constructions e.g. simple framed carcass etc. 3. Construction factors to be considered e.g. rigidity, jointing method, squareness of frame e.g. Butt and dowel joint, mortice and tenon joint, mitre and feather joints.	1. Working drawing of project is needed. 1. Exercise in framed and carcass constructions.
9.0 Timber Growth and Structures 1. Describe the growth and structure of a tree 2. Explain the various methods of conversion. Seasoning 3. Describe the various methods of seasoning timber. 4. State the advantages and disadvantages of each method.	1. Timber growth and structure. 2. Felling and conversion of timber. 3. Seasoning of timber. 4. Types of Nigerian timbers and their properties e.g. Abura, Agba, Mahogany etc.	<ul style="list-style-type: none"> - Visit a sawmill. - Use charts showing various methods. - Show samples of Nigerian timber.
5. Identify the various types of Nigerian timbers and state their properties.	1. Timber defects and causes e.g. splits, warp, twist, case-hardening, collapse etc. Fungus, white ants, woodborers.	1. Show samples.
1.0 Manufactured	1. Common manufactured boards	1. Examine some

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<p>Boards</p> <p>1. Identify common manufactured boards and state their uses.</p>	<p>and their uses. Plywood, lamin-board, block-board, chip board etc.</p> <p>2. Properties e.g. grain, figure density etc.</p>	<p>samples of boards.</p> <p>2. Collect specimens.</p>
<p>12.0 Adhesives</p> <p>1. State and describe types of adhesive and their composition e.g. protein, synthetic resin etc.</p> <p>2. Prepare glue for use.</p>	<p>1. Main types of adhesive: protein, synthetic resin and contact, animal vegetable and thermoplastics glues (PVC, ponal).</p> <p>2. Properties, preparation and application of each type.</p>	<p>1. Apply the different types of adhesive to on-going projects.</p> <p>2. Show the students different types of adhesive.</p>
<p>13.0 Fittings and Fastenings</p> <p>1. List and identify various types of fittings.</p> <p>2. Explain and state the properties of the fasteners and materials used for common fitting.</p>	<p>1. Types of fitting, e.g. hinges, locks, handles, catches etc.</p> <p>2. Selection and application of fittings.</p> <p>3. Properties of materials used for common fitting e.g. brass, mild steel, aluminium, plastics etc.</p>	<p>1. Examine different types of each hardware.</p> <ul style="list-style-type: none"> - Make freehand sketches; - Make projects; using various types of fittings and fasteners. <p>2. Demonstrate correct methods of fixing fittings.</p>
<p>14.0 Wood Finishing</p> <p>1. Explain the purposes and state types of wood finishing materials.</p>	<p>1. Purposes of finishing wood.</p> <p>2. Types of wood finishes e.g. paints varnishes, pigments etc.</p>	<p>1. Prepare the surface.</p>
<p>1. Name the composition of finishing materials.</p> <p>3. Prepare wood surface for finishing.</p>	<p>3. Composition of common wood finishing materials.</p>	<p>1. Apply finishes to on-going job.</p>

FUNDAMENTALS OF MACHINE WOOD WORKING I (C.M.W. – 12)

Topic/Objective	Contents	Activities/Remarks
<p>1.0 Pull-Over Cross Cutting Machine</p> <p>1. Describe the main features; and working principles, metal properties, operation and safety precautions of pull-over cross cutting machine.</p> <p>2. Identify the various cutters and accessories, mount and dismount cutters, saw blades sharpen, operate the machine.</p> <p>2. Carry out some routine service and maintenance on the machine.</p>	<p>1. Features of a pull-over, cross cutting machine.</p> <p>2. Principles of operation.</p> <p>3. Safety precautions.</p> <p>4. Various cutters and accessories.</p> <p>5. Machine mounting.</p> <p>6. Routine service and maintenance.</p>	<p>Making of basic wood work joints and demonstrations.</p> <p>Cross-cutting timber to required rough length. Square and regular cutting. Strict adherence to safe working and the use of safety devices must be emphasized at all times.</p> <p>Cutting operations: straight and angular. Trenching operations.</p> <p>Clean and oil the machine.</p>
<p>2.0 Circular Saw</p> <p>1. List, identify and explain features, parts, scope and principle of operating circular saw.</p> <p>2. State safety instructions, fix and remove saw and riving knife; construct jigs, and fixtures, change speed, change, sharpen blade and lubricate the machine parts.</p>	<p>1. Main features of circular ripping saw. - Scope and operating principles.</p> <p>2. Types of saws and their uses. - Shapes of saw teeth, hook, gullet etc. guards, riving knife, push stick, safe operational technique.</p> <p>3. Jigs or fixtures.</p> <p>4. Saw speed calculation.</p> <p>5. Machine operations.</p> <p>6. Machine lubrication.</p>	<p>- Cutting to the width.</p> <p>- Adjusting of fence and guard.</p> <p>- Rise and fall table exercises in ripping, deeping, grooving, rebating, tenoning, etc.</p> <p>Emphasis on safety regulations as stipulated by Federal Ministry of Labour.</p> <p>Use jigs and fixtures for projects.</p> <p>Application of push stick while sawing.</p>

Topic/Objective	Contents	Activities/Remarks
<p>3.0 Dimension Saw Bench</p> <p>1. State the features and working principles of saw bench, its operation, state safety precautions and identify the metal/materials used in the manufacture of components parts.</p> <p>2. Calculate spindle speed and peripheral speed of saw, mount the saw blades, and lubricate the machine parts.</p>	<p>1. Features of dimension saw.</p> <ul style="list-style-type: none"> - Principles of operation. - Necessary safety precautions. - Metal/materials used in the manufacture of components. <p>2. Set the blade into spindle and tighten it.</p> <ul style="list-style-type: none"> - cross-cutting to length mitring. - mitring - tongue and groove. - rebating, ripping etc. <p>3. Maintenance, cleaning etc.</p> <p>4. Calculation of spindle and peripheral speed of the saw blade.</p>	<p>Instruction and demonstration for correct and safe use.</p> <p>Sawing exercise to cover straight and angular work.</p> <p>Any adjustment should be done before switching on the machine.</p> <p>Safety precautions and regulations to be observed.</p> <p>Routine service as given by the manufacturer.</p>
<p>4.0 Surface Planer</p> <p>1. State and list some of the precautions and common materials used in manufacturing the machine and explain the scope and principles of operation of the surface planer.</p> <p>2. Observe the safety precautions involved while operating the machine, explain the purpose of devices and calculate the speed of the cutter.</p>	<p>1. The surface planer – materials used in the manufacture of the components e.g. cutters, table, block, etc.</p> <p>2. Arrangement and functions of various parts and methods of adjusting tables and fence. Methods used and patent devices for resetting cutters.</p> <p>3. Necessary safety precautions.</p> <p>4. Planing ‘out of wind’, squaring, bevelling, rebating, use of back stops, push blocks and springs for safe working and to reduce accident risk.</p> <p>5. Mount and dismount the cutters.</p> <p>6. Maintenance.</p>	<p>Demonstration the safe operation of the machine.</p> <p>Exercises on surfacing and squaring stock.</p> <p>Exercises to include bevelling and tapering with the use of back stop.</p> <p>Correct adjustment and setting of guard.</p> <p>Setting of cutter in machine sharpening etc. Planing, the surface and edge of timber, tapering and stopped rebating, etc.</p> <p>Sketch the machine lubricate machine.</p>
<p>3. Explain the cutting action of the blades,</p>		

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operate the surface planer, replace and remove cutters – routine service of the surface planer.		
<p>5.0 Thicknessing and Combination Planing Machines</p> <p>1. Describe and identify the features, functions of component and hazards of the machines.</p> <p>2. Explain and outline the safety and the principles of operating the machines.</p> <p>2. Identify operating faults, calculate the speed of cutter block and feed rollers, sharpen and set cutter and perform routine service.</p>	<p>1. Working principles of thickness and combination planing machine.</p> <p>2. Types of cutter blocks used and methods of sharpening and resetting cutters, power source etc, use of jigs.</p> <p>3. Causes of accidents and remedies.</p> <p>4. Operational faults.</p> <p>5. Calculation of the number of cutter mark per 25cm, high or low cutter speed.</p> <p>6. Maintenance work.</p>	<p>Features of design. Sectional and solid feed tools and pressure. Correct adjustment of feed rollers and pressure bars.</p> <p>Demonstrate the uses of the machine.</p> <p>Sharpening, honing, whetting etc.</p> <p>Demonstration on knife grinding and balancing to be emphasized.</p> <p>Mount and dismount cutters correctly. Lubricate cutters.</p>
<p>1.0 Rods, Route Sheet and Cutting List</p> <p>1. List and explain types of rods, route sheets, the purposes and limitations and prepare setting out rod.</p> <p>2. Explain set-out rods, the purposes of a cutting list and type of cutting list.</p>	<p>1. Types of rods, route sheet and cutting lists – purposes.</p> <p>2. Workshop use of rods, route sheet etc. for production.</p> <p>2. Differentiate between height and width rods – door, steel kitchen units, bookshelves etc.</p> <p>4. Determining the cost of job.</p> <p>5. Exploded orthographic and pictorial view and sketching.</p> <p>6. Route sheet preparation.</p>	<p>Full-size rods of the job, pattern or boards, scale and detailed drawing to conform with joinery and furniture produced with correct form of cutting lists.</p> <p>Differentiate between a rod and route sheet by making them on board. Selection of materials, consideration must be given to design and safety in all forms of machine exercise.</p>
3. Draw and sketch exploded orthographic		

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<p>and pictorial view and working drawing and prepare route sheets for the production of joinery and furniture items.</p>		
<p>7.0 Narrow Band Saw</p> <p>1. Identify and explain the parts and working principles of narrow band saw, safety precautions, method of straining the saw blade and principles involved.</p> <p>2. Set up and use the machine for various operations, jigs, calculate the length of the blades, braze or butt weld the blades and perform routine service of the narrow band sawing machine.</p>	<p>1. Narrow band saw machine.</p> <ul style="list-style-type: none"> - functions, the materials and uses of each of the part. <p>Ensure that wheels are clean. Both top and bottom wheels are covered before operation.</p> <p>2. Application of safety precaution e.g. isolate power before fixing the saw blades.</p> <p>3. Straining of the saw blade.</p> <p>4. Care of wheels, guides and guard, adjustment for efficient and safe working condition, making and setting of temporary fences.</p> <p>5. Mounting of saw blade and tracking, setting of guides and guard.</p> <p>6. Production of simple jigs.</p>	<p>Care of wheels and guide adjustment for efficient and safe working.</p> <p>Use of jigs.</p> <p>Exercise of sawings to straight lines and simple curves marked from item plate.</p> <p>Demonstration of safe operation of the machine.</p>

FUNDAMENTALS OF MACHINE WOODWORK II (C.M.W. – 13)

Topic / Objective	Contents	Activities / Remarks
<p>1.0 The Mortising Machine</p> <p>1. State and describe the working principles, layout, types of job each machine cutter performs and type of clamping devices.</p> <p>2. Install, set up cutters, for mortising operations, safety and operational precautions related to the use of the machine.</p> <p>3. Grind and sharpen mortise chisels and chains.</p>	<p>1. Working principles of a mortising machine.</p> <p>2. Types of cutters: (i) Hallow chisels. (ii) Chain cutter, method of driving single head and combined chain, pitch of chains, correct combination of sprocket wheel, guide and chain for accurate work.</p> <p>3. Different sizes of chisels. Use of stop bars for repetitive work.</p> <p>4. Grinding and sharpening of chisels.</p>	<p>Safety instruction.</p> <p>Fitting and using chisels, correct mortising procedure and chisel maintenance. Making of jigs for repetitive work. Practice in the use of various pitches of chains, carrying out mortising operation.</p> <p>Emphasize safe working rules and adjustment of cutting tools.</p>
<p>2.0 Tenoning Machine</p> <p>1. Explain the working principles of cutter blocks, state the types of job of each cutter, the spur cutters and state the relationship of tenoning – to mortising.</p> <p>2. Apply safety and operational precaution.</p> <p>3. Set up machine to produce tenons, backing piece, sharpen and cut off and balancing cutters.</p>	<p>1. Single-end tenoning machine. - Mount cutter on the machine. - Split tapered cutter block. - Circular cutter block. - Scribing cutter block. Spur cutters and its functions. Set vertical and horizontal adjustment. Setting of head and accurate set ups.</p> <p>2. Produce template for setting tenoning cutter.</p> <p>3. Shape of scribing cutter for moulding operation. Trenching square tenoning. Forked tenon and comb joints. - produce jig for safe and accurate production of angle tenon. Sharpening and setting saw. - purpose of balancing of cutters, oiling, lubrication and cleaning periodically.</p>	<p>Setting for tenons, square and stopped – shoulders, single and double scribes. Cutter making. Use of cut off saw. Saw and tenon cutter. Sharpening: Use of backing the fences for square.</p> <p>Method of trenching. Edge moulding and joints. Exercises on square tenoning. Make templates. Mortise and tenon joints on the machines. Set scribing cutter to produce mould. Instructions on safety and use of machine.</p> <p>Design the jig. Apply backing piece and stops fence.</p>

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		<p>Grind tenon, cutter scribing and spur cutters to the required profile.</p> <p>Put the cutters into the balancing machine, cleaning, oiling etc.</p>
<p>3.0 The Boring, Machine</p> <p>1. State the principles of boring machine. Identify major components, explain the scope of operation and safety precautions.</p> <p>2. Choose the suitable bits mount and remove it, mark out the work pieces with simple jigs and fixtures.</p> <p>3. Set the machine for various boring, sharpen bits, and replace worn belts and routine services.</p>	<p>1. Principles of operations of boring machine.</p> <p>2. Major components e.g. motor, chuck, spindle, pulleys, table, leverage clamping device etc.</p> <p>3. Selecting the bits in chuck. Check the work, make patterns, jigs and fixtures single and double hole.</p> <p>4. Maintenance.</p>	<p>Demonstrate the operations of the boring machine.</p> <p>Check the power before switch-on. Check the correct bits for sizes.</p> <p>Make simple jigs and fixtures.</p> <p>Carry out boring operation to given specification.</p>
<p>2. Apply safety precautions, adjust the work-table to working height and explain the working principles.</p> <p>4. Describe and explain main features of a dust extractors and safety operational techniques.</p> <p>4. Perform the routine service of sanding machines.</p>	<p>3. Apply the belt to the face of the job using hand pad, travelling pressure pad, spiral contact mechanism, features etc.</p> <p>4. State functions: floating pressure rollers, drum etc, dust extractors with the factory regulations.</p>	<p>Select the grade of sand paper for each drum, fit for sand paper on the drum.</p> <p>- observe safety regulations.</p> <p>- undertake service, oiling, cleaning etc.</p>